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| 10/769,835 | 02/02/2004 | Srinath Krishnan | 039153-0694 | 9075 |
| 26371 | 7590 | 12/12/2005 | EXAMINER | |
| FOLEY & LARDNER LLP 777 EAST WISCONSIN AVENUE SUITE 3800 MILWAUKEE, WI 53202-5308 | | | MENZ, DOUGLAS M | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2891 | |

DATE MAILED: 12/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary

Application No.

10/769,835

Applicant(s)

KRISHNAN, SRINATH

Examiner

Douglas M. Menz

Art Unit

2891

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 October 2005.
 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 and 21-24 is/are pending in the application.
 4a) Of the above claim(s) 9-16 and 21-24 is/are withdrawn from consideration.
 5) ☐ Claim(s) _____ is/are allowed.
 6) ☒ Claim(s) 1-8 is/are rejected.
 7) ☐ Claim(s) _____ is/are objected to.
 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
 10) ☒ The drawing(s) filed on 02 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
 Paper No(s)/Mail Date _____.
 4) ☐ Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____.
 5) ☐ Notice of Informal Patent Application (PTO-152)
 6) ☒ Other: Search History.

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of Species I of Group I, claims 1-8, in the reply filed on 10/4/05 is acknowledged. The traversal has no specific grounds as to why the restriction was improper and is therefore not found persuasive. The requirement is still deemed proper and is therefore made FINAL.

Newly submitted claims 21-24 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: Claims 21-24 pertain to a method which depicts different characteristics of sidewalls of the same trench, whereas the invention of claims 1-8 pertain to a method which depicts generic first and second sidewalls of a plurality of trenches.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 21-24 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 3 recites the limitation "the silicon nitride layer" in line two. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-2 and 4-5 are rejected under 35 U.S.C. 102(e) as being anticipated by Efferenn et al. (US 6770530).

Regarding claim 1, Efferenn discloses a method of manufacturing an integrated circuit having trench isolation regions in a substrate, the method comprising (Figs. 1-8):

Forming a mask layer above the substrate;

Selectively etching the mask layer to form apertures associated with locations of the trench isolation regions;

Forming trenches in the substrate at the locations (Figs. 6-8);

Forming first type liners (15) on first side walls of the trenches associated with first type regions of the substrate (P-FET region Figs. 6-8); and

Forming second type liners (15 and 19) on second side walls of the trenches associated with second type regions (N-FET region Fig. 8).

Regarding claim 2, Efferenn further discloses providing an insulative material in the trenches to form trench isolation regions since layers 15 and 19 are both insulative (Figs. 6-8 and Col. 5).

Regarding claim 4, Efferenn further discloses wherein the first type liners are a first thickness and the second type liners are a second thickness, the second thickness being different than the first thickness (Fig. 8 P-FET region's liner contains only layer 15 and N-FET region's liner contains layer 15 and 19, thus being thicker).

Regarding claim 5, Efferenn further discloses wherein the first type liners are dry oxide material (15, Figs. 6-8 and Col. 5) and the second type liners are dry heavily nitrided oxide material (15 and 19, Fig. 8 and Col. 5).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Efferenn et al. (US 6770530) in view of Lee et al. (US 6737706).

Regarding claims 6-7, Efferenn discloses the method of claim 1 as mentioned above, however, Efferenn does not explicitly disclose wherein the substrate is on an SOI substrate as in regards to claim 6 or that the substrate trenches reach a buried insulative layer of the substrate as in regards to claim 7. Lee discloses that it is known in the art to form trench isolation features (41) on SOI substrates (30) wherein the trenches reach the buried insulative layer (15) (Fig. 1 and Col. 1). It would have been obvious to one of ordinary skill in the art to implement Efferenn's method with a SOI substrate as taught by Lee because Lee explicitly discloses in the background section that such teachings are conventional.

Regarding claim 8, Efferenn discloses the method of claim 1 as mentioned above and further discloses a first and second region (P and N type), however, Efferenn does not explicitly disclose wherein the substrate includes a strained silicon layer. It would have been obvious to one of ordinary skill in the art at the time the invention was made

to incorporate Efferenn's teaches with a strained silicon layer because doing so was well known in the art at the time of the invention.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas M. Menz whose telephone number is 571-272-1877. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Baumeister can be reached on 571-272-1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DM

 12/8/05